

Technology Deployment for Asbestos Destruction

Technology Need:

Waste asbestos from abatement activities at Department of Energy (DOE) facilities is typically disposed of in landfills, as is most asbestos waste in the United States. However, some of the asbestos from DOE facilities is contaminated with radionuclides, PCBs, RCRA metals and perhaps other regulated components, which may require pre-treatment prior to landfill disposal. Landfilling of waste is becoming less desirable to the public and does nothing to reduce the toxicity or the continued liability associated with the wastes. Methods for permanent destruction of Asbestos Containing Material (ACM) are becoming more attractive as a final solution.

Technology Description:

Thermochemical conversion technology, pictured in Figure 1, uses a combination of chemical treatment and heat to cause remineralization of asbestos and other silicate materials. The remineralization process accomplishes several goals including:

- ▶ Conversion of asbestos minerals into non-asbestos minerals without melting
- ▶ Destruction of organic compounds through pyrolysis and/or oxidation
- ▶ Immobilization of metals and radionuclides

The process involves shredding and then mixing ACM with proprietary fluxing agents and heating the mixture. The presence of the fluxing agents at elevated temperatures (approximately 2200°F) results in the rapid remineralization of asbestos fibers. The process also results in the destruction of organics, including PCBs to 99.9999 percent destruction removal efficiency. Toxic metals are

stabilized in the sintered product and preliminary testing suggests the process will also be effective for radionuclides. The processing equipment consists of four primary systems including feed preparation, rotary hearth converter, off-gas treatment, and product removal.

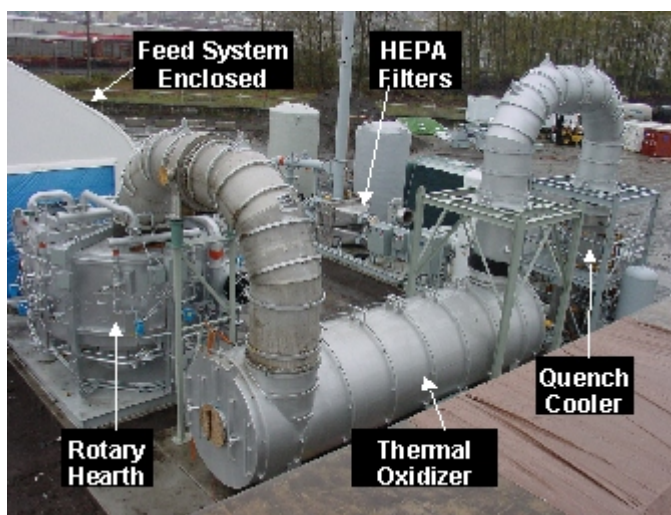


Figure 1. Ten ton per day thermochemical conversion system

Benefits:

The baseline technology for disposal of asbestos in the United States is land-fill disposal. Thermochemical conversion of ACM has the following advantages over landfill disposal:

- ▶ Permanently converts asbestos to non-hazardous, inert material
- ▶ Results in significant volume reduction (asbestos is typically low density, taking up valuable landfill space)
- ▶ Destruction of asbestos eliminates potential for future liability issues possible with landfill disposal

Status and Accomplishments:

The project was completed in August 2002. ARI Technologies, Inc. successfully demonstrated its thermochemical conversion process on ACM generated at the Savannah River Site (SRS). The demonstration was conducted at ARI's facility in Tacoma Washington, using a 10-ton/day system to treat ACM transported from SRS.

The purpose of the demonstration was to:

- ▶ Destroy 10,000 lb. of asbestos-containing material (ACM), defined as asbestos fibers and binder by feeding it through an EPA-permitted asbestos destruction technology, such that the resultant materials are no longer considered to be asbestos in accordance with 40 CFR 61.155; and
- ▶ Collect and analyze performance data for the deployed asbestos destruction technology.

Based upon the results of the tests conducted under this program and with previous work, ARI has demonstrated that:

- ▶ Thermochemical conversion of asbestos can be accomplished effectively and economically;
- ▶ The technology is effective on organic wastes (such as PCBs), and can immobilize metals and surrogate radionuclides;
- ▶ The system used in this project demonstrated that the residence time required for complete asbestos conversion could be reduced from 50 minutes to 20 minutes at large scale; and
- ▶ Additional tests on a smaller scale demonstrated that conversion could be accomplished in 10 minutes.

The cost for thermochemical conversion of ACM using ARI's technology ranges from approximately \$175 to \$225 per ton based on a 37 ton/day system (not including transportation). This cost is not

currently competitive with landfill disposal of ACM in the US, which typically costs between \$50-100 per ton (for ACM waste with out other co-contaminants). ARI's process is cost effective for, and uniquely suited to treatment of ACM that may also be contaminated with PCBs, RCRA metals, and/or radionuclides, which has more complicated disposal requirements and a higher disposal cost.

ARI is currently in the process of building a system to be sited in Dublin, Ireland In Europe, where regulatory trends are shifting away from landfill disposal of ACM and requiring "stabilization", destruction, or conversion, ARI's technology has a greater market for treatment of ACM.

Contacts:

Dale Timmons
Asbestos Recycling Inc.
Phone: (206) 575-9700
E-mail: dtimmons@hermanson.com

Cliff Carpenter
National Energy Technology Laboratory
Phone: (304) 285-4041
E-Mail: clifford.carpenter@netl.doe.gov

Online Resources:

The National Energy Technology Laboratory Internet address is <http://www.netl.doe.gov>

For additional information please visit the ARI Technologies, Inc. website at <http://www.aritechnologies.com>